Factors Affecting Gross Return of Binadhan-11 Produced At Different Districts of Bangladesh
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Abstract
The study was conducted in five major Binadhan-11 growing areas of Bangladesh, namely Mymensingh, Sherpur, Jamalpur and Kurigram. The sample farmers were profitable to cultivate Binadhan-11 in the study area. Cobb-Douglas production function was applied for estimating the Binadhan-11 production function which implied the factors affecting with respect to labor and seedling cost that were positive values at Mymensingh, Sherpur and Jamalpur district respectively. Fertilizer, insecticide and power tiller that were positive values of 0.233, 0.121 and 0.234 and also significant. The reasons that hamper the achievement of goals are defined as problems whereas suggestions are indications of some measures to overcome these problems. The Binadhan-11 producers faced some major problems such as the scarcity of farm labour and high wage rate, adulterated fertilizer and insecticide, short supply and high price of fertilizers, lack of credit facilities, transportation problem, and lack of adequate market information in the study area.

Keywords: Factors, Regression, Coefficient and Problems.

INTRODUCTION
Agricultural development in an agrarian economy largely depends on the existing nature of man-land relationship. According to Bishop and Toussaint [1] both land lord and tenant are utilizing inputs belonging to other party. The focus of this study is to measure the factors affecting gross return of Binadhan-11 growing farmers. In Bangladesh most of the farmers are not used their inputs efficiently. They also affect the degree of uncertainty encountered in the operation of a farm. At present only 5, 18 and 13% of rice, wheat and jute seeds respectively are supplied from recognized seed companies and the rest of the seeds are available from farmers’ sources [2]. Cost effectiveness of rice seed production is most important in rice cultivation by which a farmer feels interested to produce more rice seed for his economic development. By 2050, global population is expected to reach 9.6 billion [3]. As a result, the consumption of staple cereals, including rice, wheat, maize, as well as fish and meat products is expected to increase dramatically- particularly in rapidly developing countries [4]. To ensure cereal food security alone in 2050, more than a doubling of production is required [5]. This situation is complicated by the anticipated strain on global cropland availability, resulting in calls to intensify production on available land in order to avoid natural land.

From the economic point of view, if the farmers get minimum 1:1.50 taka for every taka of investment then it seems to be cost effective and the benefit is economically acceptable [6]. Like the basic inputs viz. seed, fertilizers, pesticides, irrigation and appropriate management, apart from socio-economic factors, may also influence the effectiveness of rice seed production at farmer’s level. The socio-economic factors usually influence farmers’ decisions as to which crop/variety is to be grown, which enterprise is to be run and so on. There are some socio-economic factors, having influences even on the particular crop production practice are to be followed, which might have significant impact on crop yield and productivity. Farm size, farmers’ education level, technical knowledge of the farmers, training and farming experience etc. may have positive relationship with crop yield. The factors like farmers low income, lack of personal and interpersonal communication skill, less exposure to media etc. might have negative relationship with crop yield and productivity. Different socio-economic factors like education level, farming experience, farm size, linking with GO/NGOs, annual income etc. plays a significant role in the adoption process of modern agricultural technologies among the farmers. Moreover, the success of modern agriculture is
dependent on the farmers’ knowledge and experience along with available inputs. In view of the above, this study was conducted to achieve i) to examine the factors affecting gross return of Binadhan-11 produced different districts; and ii) to identify the major problem faced by the Binadhan-11 grower farmers.

**MATERIALS AND METHOD**

The study was conducted in five major Binadhan-11 growing areas of Bangladesh, namely Mymensingh, Sherpur, Jamalpur and Kurigram. A total of 120 farmers were randomly selected as sample size by using multistage sampling method in the study area, 30 from each District. Data were collected from Binadhan-11 growers through interview schedule. Some descriptive statistics were used for analyzing the collected data.

The specification of the Cobb-Douglas production function was as follows:

\[ Y_i = a X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5} e^{u_i} \]

Where,

- \( Y_i \) = Gross return (Kg/ha);
- \( X_1 \) = labor cost (Man days/ha);
- \( X_2 \) = Seedling cost (Tk/ha);
- \( X_3 \) = Fertilizer cost (Kg/ha);
- \( X_4 \) = Insecticide cost (Kg/ha);
- \( X_5 \) = Power tiller cost (Tk/ha);
- \( a \) = Constant or intercept term;
- \( b_1, b_2, b_3, b_4, b_5 \) = production coefficient of the respective input variable to be estimated; and
- \( u_i \) = error term

**RESULTS AND DISCUSSION**

Multiple regression analysis was done to determine the influence of various characteristics of the respondents on the dependent variable i.e. profitability of rice seed production. In the present study, regression analysis was employed to determine the influence of the independent variables on the dependent variable both individually and jointly.

Findings from a log-linear specification are measured in table 1 the estimated Cobb-Douglas production function for Mymensingh was:

\[ \ln Y_i = 5.983 + 0.235 \ln X_1 + 0.301 \ln X_2 + 0.125 \ln X_3 + 0.184 \ln X_4 - 0.208 \ln X_5 \]

The contribution of selected factors to production and returns from component can be examined from the individual regression co-efficient, which is discussed below.

**Labour cost (X_l)**

The regression coefficients for Binadhan-11 component under Mymensingh, Kurigram, Sherpur and Jamalpur districts implying that the one percent increase in the labour use cost increase the gross return from rice by 0.235, 0.086, 0.0258 and 0.315 percent, respectively. The coefficient of Mymensingh and Sherpur districts are significant at five percent and Jamalpur district is one percent level of significance which also indicated the over use of labour in the farming activities.

**Seeding cost (X_s)**

It is shown from the results presented in table 8 that the coefficient of seedling cost of the Binadhan-11 production was statistically significant at 1 percent level of significance for first Mymensingh district. The result implies that 1 percent increase in the seedling cost for Mymensingh district, keeping other factors constant, would result in an increase in gross return from rice by 0.315 percent. The coefficient of seedling cost of the rice production was statistically significant at 5 percent level of significance for next three districts. The result implies that 5 percent increase in the seedling cost for Mymensingh, Kurigram, Sherpur and Jamalpur districts farming systems, keeping other factors constant, would result in an increase in gross return from rice by 0.231, 0.236 and 0.254 percent, respectively.

**Fertilizer cost (X_f)**

From the table 1, the coefficient of fertilizer cost for Binadhan-11 component under Mymensingh, Kurigram, Sherpur and Jamalpur districts were positive and statistically significant for Kurigram district. The result implies that 1 percent increase in the fertilizer cost, keeping other factors constant, would result in an increase in gross return from Binadhan-11 by 0.125, 0.233, 0.253 and 0.263 percent, respectively.

<p>| Table-I: Estimated values of co-efficient and related Statistics of factors affecting gross return of Binadhan-11 produced different districts |
|-------------------|------------------|------------------|------------------|------------------|------------------|</p>
<table>
<thead>
<tr>
<th>Independent variable cost</th>
<th>Mymensingh</th>
<th>T value</th>
<th>Kurigram</th>
<th>T value</th>
<th>Sherpur</th>
<th>T value</th>
<th>Jamalpur</th>
<th>T value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>5.983</td>
<td>(1.203)</td>
<td>-</td>
<td>5.757</td>
<td>(1.054)</td>
<td>-</td>
<td>6.733</td>
<td>(1.174)</td>
</tr>
<tr>
<td>Labour cost (X_l)</td>
<td>0.235**</td>
<td>(0.110)</td>
<td>2.136</td>
<td>0.086</td>
<td>(0.076)</td>
<td>1.123</td>
<td>0.258**</td>
<td>(0.090)</td>
</tr>
<tr>
<td>Seedling cost (X_s)</td>
<td>0.301***</td>
<td>(0.085)</td>
<td>3.561</td>
<td>0.231**</td>
<td>(0.094)</td>
<td>2.445</td>
<td>0.236**</td>
<td>(0.108)</td>
</tr>
<tr>
<td>Fertilizer cost (X_f)</td>
<td>0.125</td>
<td>(0.080)</td>
<td>1.560</td>
<td>0.233**</td>
<td>(0.093)</td>
<td>2.515</td>
<td>0.253</td>
<td>(0.175)</td>
</tr>
<tr>
<td>Insecticides cost (X_i)</td>
<td>0.184</td>
<td>(0.153)</td>
<td>1.201</td>
<td>0.196</td>
<td>(0.156)</td>
<td>1.256</td>
<td>0.121**</td>
<td>(0.047)</td>
</tr>
</tbody>
</table>

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The effectiveness of the used fertilizers and insecticides that the farmers had to face the loss cultivation of Binadhan-11. About 75, 75, 80 and 65 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported that the fertilizers were adulterated. To solve this problem, govt. took steps to control the adulteration of fertilizers and insecticides. To solve this problem, govt. and insecticides that the farmers had to face the loss cultivation of Binadhan-11. About 75, 75, 80 and 65 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported that the fertilizers were adulterated. To solve this problem, govt.

The reasons that hamper the achievement of goals are defined as problems whereas suggestions are indications of some measures to overcome these problems. The farmers faced various problems which are discussed below:

**Scarcity of farm labour and high wage rate**

Though the labourers are available in Bangladesh but most of them are unskilled and in the peak period the required labour was not available in the study area. In the farms most of the labourers, were totally illiterate. They did not help in scientific way, which reduce wastage in the production process. About 72, 61, 65 and 80 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively claimed this problem in the study area. All most 70 percent the farmers reported this problem on an average. To overcome this problem, the mechanization system should be developed.

<table>
<thead>
<tr>
<th>Name of the problems</th>
<th>Districts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sherpur (%)</td>
</tr>
<tr>
<td>Scarcity of farm labour and high wage rate</td>
<td>72</td>
</tr>
<tr>
<td>Adulterated fertilizer and insecticide</td>
<td>75</td>
</tr>
<tr>
<td>Short supply and High price of fertilizers</td>
<td>85</td>
</tr>
<tr>
<td>Lack of credit facilities</td>
<td>80</td>
</tr>
<tr>
<td>Transportation problem</td>
<td>55</td>
</tr>
<tr>
<td>Lack of adequate market information</td>
<td>65</td>
</tr>
</tbody>
</table>

Source: Field survey, 2016
should take to implement the law and order properly by law enforcement agencies.

**Short supply and high price of fertilizers**

Fertilizers were the important inputs in rice production. That's why the price hike in fertilizers was very much burning issue to be discussed by the farmers as they were interviewed. About 85, 80, 90 and 95 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported this problem. On an average about 88 percent farmers reported this problem as one of the major problems. The government should take initiative to higher subsidy and proper maintenance of supply and market channel to solve this problem.

**Lack of credit facilities**

Working capital is an important factor for the farmers. Most of the farmers reported that they suffered from shortage of necessary capital during the period of full operation. Due to shortage of working capital the farmers could not purchase necessary inputs in a large volume to meet up their demand in lean period. In the study area, About 85, 70, 75 and 80 percent farmers of Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported this problem. The govt. and NGOs should take initiative to increase the credit facilities for the farmers.

**Transportation problem**

The transportation problems were different for different modes of transportation as well as for different market locations. Transportation problem becomes serious in the peak period of Aman and Boro seasons. The transportation cost is higher in those seasons compare to rest of the year. In the study area, on an average 65 percent farmers reported this problem. This problem can be solved by the ministry of LGRD and co-operatives to implement the proper steps.

**Lack of adequate market information**

Lack of adequate market information was a problem for the farmers. The farmers could not collect market information rapidly due to shortage of support service from the government. The percentage of the farmers were 65, 65, 70 and 50 for Sherpur, Jamalpur, Kurigram and Mymensingh districts, respectively reported about this problem and the average shows that 63 percent farmers of all farming systems reported this kind of problem. Adequate market information should be developed by media and other informants.

**Other Problems**

Besides the problems, which are discussed above, the farmers have to face some risk and uncertainties, which sometimes causes severe losses. These risks may arise due to various internal and external activities such as inadequate irrigation facilities Lack of technical knowledge, Homestead and village erosion vulnerability.

**CONCLUSION**

It is evident from the above-mentioned discussion that the sample farmers were profitable to cultivate Binadhan-11 in the study area. But some problems and factors were influenced throughout the production process. If the farmers become more conscious and modern implements are used in agricultural production activities, they will get maximum benefit to cultivation of Binadhan-11.

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**Conflict of Interest**

This manuscript is original and contains not any published material. The corresponding author confirms that all of the others authors have read and approved the manuscript and thus declare no conflicts of interest.

**Author’s Contributions**

Syful Islam: Contributed in designing and performing the experiments, samples analysis, data analysis, manuscript writing and the manuscript reviewing all through the publication process.

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Equally contributed in designing the experiments, data collection, data entry and reviewing during the publication process

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